TECHNOCRACY TRENDEVENTS — AUGUST 2006

Raiding The Earth's Trust Fund, by Janet Ranganathan, March 31, 2005
[http://www.tompaine.com/print/raiding_the_earths_trust_fund.php]

A few years ago, the most prominent environmental scientists in the world met to do an audit of Planet Earth's holdings. The results, released yesterday, were not encouraging. Janet Ranganathan of the World Resources Institute says two-thirds of the planet's resources have been consumed. Business as usual is not only irresponsible, it is now impossible.

Janet Ranganathan is director of biological resources at the World Resources Institute in Washington D.C. More information about the Millennium Ecosystem Assessment (MA) is available at [*www.maweb.org.*]

Beginning four years ago, more than 1,300 of the world's pre-eminent scientists from 96 countries assembled to undertake an audit of Earth's wetlands, drylands, marine, coastal, forests, and inland water, just to name a few.

This "audit," is the Millennium Ecosystem Assessment (MA), the first-ever comprehensive look at the condition of natural systems and the services they provide to people — such as food, water, fiber, carbon storage, and flood, disease and climate control. The results merit attention. Nearly two-thirds of nature's services that underpin human well-being are degraded or being used unsustainably. This coincides with a period of growing demand for these services to both support an expanding population and to help lift millions of people out of poverty. It's clearly time to rethink the business.

But the MA isn't just another gloomy scientific study. Released March 30 in cities around the world, it offers an innovative approach to reconcile the hitherto competing goals of human development and environmental stewardship, using the concept of ecosystem services. It also provides a wealth of information and insights that can make for more informed development decisions that weigh both the benefits and consequences of ecosystem change to human well-being.

The MA findings are nothing short of stunning. For instance, over the last 50 years, humans have changed ecosystems more rapidly than at any time in human history, largely to meet growing demands for food, fresh water, timber, and fiber. Some examples include:

- Since 1945, more land was converted for agricultural use than in the 18th and 19th centuries combined.
- Water impounded behind dams quadrupled since 1960, and the amount of water held in reservoirs is, by far, greater than the volume flowing in natural rivers.
- More than half of all the synthetic nitrogen fertilizer ever used occurred since 1985.
- Humans have increased the species extinction rate by over 100 times the natural rate.

These changes are not without benefit: the resulting increase in food, fiber, and other services has contributed to improved human well-being; however, the gains are unevenly distributed, and the poor have more often borne the associated costs. These include the loss of access to ecosystem services that they previously depended upon for their livelihoods, such as small-scale fisheries that have collapsed following moves to more intensive harvesting by industrial-scale fishing operations or the loss to indigenous people of natural forest services when large-scale deforestation for timber occurs in the Amazon or Indonesia.

As they look forward for the next 50 years, the MA experts project demand for food will grow by 70 to 80 percent and the demand for water by about two-thirds. Though we farm roughly one-third of the planet's surface already, we will convert another 10 to 20 percent of remaining grassland and forestland for food production.

Habitat change, overexploitation, invasive species, pollution, and climate change will each either grow in intensity or remain constant. Drylands, which cover 41 percent of land surface and are home to a third of the world's population — many already suffering from problems such as malnutrition and disease — were identified as especially vulnerable.

Options exist to curtail this degradation, but they require a sea change in attitudes, policies, institutions, and behavior change. Everything should be on the table: subsidies that promote overproduction, greater use of market-based approaches, application of new technology, and new ways to integrate ecosystem stewardship into all types of decision-making that impact ecosystems — not just those taken in environment departments.

No single silver bullet fix exists for this complex interlinked problem of ecosystem degradation; but one thing is abundantly clear: "Business as usual" is no longer an option. The time has come to stop operating Planet Earth like a business and start thinking of it as a family trust fund set up for the benefit of today's as well as tomorrow's children.

Energy Democracy, by Kate Cell, August 1, 2006 — TomPaine.com

Kate Cell is Director of Development and Communications at the Prometheus Institute for Sustainable Development, a nonprofit working to accelerate the deployment of sustainable technologies, and editor for Economists for Peace and Security, a United Nations-accredited nongovernmental organization promoting economic analysis and appropriate action.

This summer is hot meteorologically and politically, and we're all feeling the heat. I hear people talking about energy everywhere: on the subway, after church, around the dinner table. Every major general interest magazine in the country, from *Time* to *People*, has run an energy-related cover in the past three months.

Recently at TomPaine.com, Frank O'Donnell's "The Return of Nazi Oil" warned of the perils of switching to coal-to-liquid fuel, and Tyson Slocum, in "Behind the Blackouts," explained why a deregulated, centralized distribution system fails to deliver power in California and Queens.

Our energy system and our political economy are broken: dependent on imports from unstable regions yet undependable for consumers, capricious in costs, calamitous in global climate, and security impact. To fix it we should look to localized, distributed, democratic energy sources, such as solar (photovoltaic) electricity, and free ourselves from the tyranny of fossil fuels.

Like all commodities or products (think of conflict diamonds in the Congo or the recent U.S. sale of jet fighters to Pakistan), energy operates within a political economy, whether one of war or one of peace, one of tyranny or one of democracy. The price of oil recently hit a record $78 a barrel, mostly because of the U.S. misadventure in Iraq. The markets are skittish and the world outraged at the Bush administration's insistence on invasion, occupation, mismanagement, and disrespect for the rule of law.

Meanwhile, U.S. citizens are paying high prices at the pump and the meter — at least by North American standards — but those prices don't reflect the real costs. Credible estimates that include securing and protecting the supply and cleaning up the environment put the real cost of a gallon of gas at nearly $20; the full cost of a kilowatt hour of electricity from coal, now billed at around 5 cents, is actually 17 cents. We see ExxonMobil reporting second quarter profits of a record $10 billion while blackouts leave thousands of our citizens powerless. Ten billion dollars, not incidentally, is a good approximation of the direct military cost for five weeks' worth of Bush administration policy in Iraq.

We are increasingly worried by our economy's dependence on oil from the Middle East, where all the possible kinds of group violence conflict are raging in or near the region. The cool war between the U.S. and Iran is the hottest it's been since the 1979 hostage crisis, by no means coincidentally over the question of whether Iran seeks apocalyptic weapons or nuclear fuel. If the logic of the first U.S./U.K. *casus belli* for the Iraq war (fear of nuclear, chemical or biological weapon proliferation) were valid, and if prosecuting a war depended only on logical validity and not military capability, we'd be marching into Tehran (or Pyongyang) right now; but even if our soldiers weren't terribly overtaxed, with many suffering their third and fourth tours in Iraq — even then, as Michael Klare recently pointed out for TomDispatch, U.S. military options in Iran would still be severely limited. Iran controls not only its own considerable oil reserves but can also blockade the Straits of Hormuz, "through which," writes Klare, "daily, 40 percent of the world's oil exports pass."

With all this going on, it is no surprise that O'Donnell reports that some companies are trying to cash in by substituting domestically-produced coal-to-liquid fuel for imported oil, or that Slocum finds that others prefer to maximize short-term profits, repairing the grid after it breaks rather than maintain it. Given who they are —

people or entities with capital — it would be surprising, indeed astonishing, if they weren't. That, after all, is what capital does; it's what it's for. When one resource becomes constrained, a free market substitutes another; that, in turn, is what markets are for.

In these circumstances, floating another infrastructure-heavy, centralized energy source — whether nuclear, coal, or coal-to-liquid fuel — means paddling against the current of economic and political common sense. Countries that have figured this out (such as Japan and Germany) are beginning to favor localized, distributed power generation that occurs at or near the point of use: solar electricity and heat, biomass, and ground-source heat pumps. That marks a trend away from problematic oil, coal, or nuclear power toward less constrained or dangerous resources. Solar electricity, for instance, relies on two plentiful resources always at hand: silicon (the second most abundant element in the earth's crust) and sunlight.

Petroleum companies may be realizing record profits, but the rising costs of maintaining, protecting, and delivering the nation's energy are being passed on to us. The costs for solar are falling and will continue to drop as the industry achieves economies of learning and scale. Already the solar electricity sector is growing by 30 to 50 percent per year and has done so for the past decade.

The U.S. sows its inventions in renewable energy technologies, but we don't reap the benefits — we don't meet our own energy needs or the world's need for peace and prosperity. If we chose, the U.S. could afford to subsidize the learning costs of creating cost-effective photovoltaic electricity, in the process making new jobs at home and exporting our knowledge and products worldwide. If President Bush truly believed that our nation is a positive agent for democratic change around the world, he would bet on our considerable comparative advantage to drive global innovation and adoption of renewable energy. He wouldn't just increase the amount of funding for the Solar America Initiative to $128 million as he did for fiscal year 2007. He would trade off $10 billion, or five weeks' worth of babysitting a civil war in Iraq, against dramatically increasing capacity throughout the U.S. solar industry from silicon production to installation. He'd invest in a new America — a solar America.

Natural Gas Inventories Fall... A blip or the beginning of a trend?, by Michael Vickerman, RENEW Wisconsin, July 31, 2006 [http://tinyurl.com/o7e4s]

Unbeknownst to many Americans, the demand for natural gas during the winter months, with rare exceptions, greatly exceeds real-time domestic extraction volumes. This gap is overcome by tapping into the surplus natural gas injected into vast underground caverns during the warmer months. Historically, storage volumes increase from April through October and decrease during the heating season (November through March).

The most recent storage update from the Energy Information Agency, covering the week ended July 21, packed an unwelcome surprise when it reported a net withdrawal of natural gas to the tune of seven billion cubic feet (bcf). According to AmericanOilman.com, this was the first time this decade that EIA reported a weekly decline of natural gas in storage inventories occurring between mid-April and mid-October. That week in July typically sees a build of 61 bcf.

Even though current storage volumes are running 20% above historical norms, this surprise development pushed spot market prices above the $7.50/MMBtu mark for this first time in four months.

At first blush, the market's reaction seems hasty and overwrought. Even if weekly injections between now and Thanksgiving lag behind historical volumes by 50%, there still would be more than enough natural gas to ride out a severe winter. So why are energy traders and speculators so quick to bid up prices?

Rising industrial demand for natural gas is one factor explaining their fidgety behavior. Consumption in this segment is up since January, as some of the Gulf Coast refineries and chemical plants heavily damaged by the hurricanes have returned to active duty. Indeed, the shutting down of these fuel-intensive industries last year played a significant part in reducing last winter's drawdown of stored natural gas, more than compensating for the decline in output from damaged Gulf of Mexico wells.

But July's sultry weather is the bigger story. Nothing succeeds quite like sizzling temperatures and lofty dew points in driving electricity demand into record territory. On a day like today, with afternoon temperatures in the mid-90s, every gas-fired generator controlled by the regional grid operator is cranking full-bore to keep all the building air conditioners humming.

Each year results in more buildings to cool and more gas-fired power plants to run their HVAC systems. Recent 30-day forecasts call for warmer than normal temperatures persisting through August. Yes, last summer was a hot one, but this year's heat waves are likely to force record volumes of natural gas to be released from storage before the heating season begins.

With the demand picture changing this suddenly, the surplus of natural gas in storage doesn't seem quite as reassuringly huge as it did a month ago. The market bulls are betting that the surprise contraction of stored natural gas was not merely a blip, but rather the start of a trend that will continue through summer's end. One hardly need add that higher demand will always propel prices higher unless supplies are able to match the increase stride for stride.

To that last point, it is worth pausing on another illuminating statistic from last week; namely, the record number of gas wells completed in the second quarter this year, constituting a 14% increase over year-ago levels. Yet, given the rate by which the productivity of freshly completed gas wells have declined in recent years, it would be imprudent to assume that we will be as flush this November as we seemed to be in May.

Folk Science, by Michael Shermer — *Scientific American*, August 2006

... But much of physics is counterintuitive, as is the case in many other disciplines, and before the rise of modern science we had only our folk intuitions to guide us. Folk astronomy, for example, told us that the world is flat, celestial bodies revolve around the earth, and the planets are wondering gods who determine our future...

The reason folk science so often gets it wrong is that we evolved in an environment radically different from the one in which we now live. Our senses are geared for perceiving objects of middling size between, say, ants and mountains — not bacteria, molecules, and atoms on one end of the scale and stars and galaxies on the other end. We live a scant three score and ten years, far too short a time to witness evolution, continental drift, or long-term environmental changes...

Folk science leads us to trust anecdotes as data, such as illnesses being cured by assorted nostrums based solely on single-case examples... Because people often recover from sickness naturally, whatever was done just before recovery receives the credit, prayer being the most common... The April issue of the *American Heart Journal* published a comprehensive study directed by Harvard Medical School cardiologist Herbert Benson on the effects of intercessory prayer on the health and recovery of patients undergoing coronary bypass surgery. The 1,802 patients were divided into three groups, two of which were prayed for by members of three religious congregations. Prayers began the night before the surgery and continued daily for two weeks after. Half the prayer recipients were told that they were being prayed for, whereas the other half were told that they might or might not receive prayers. Results showed that prayer itself had no statistically significant effect on recovery. Case closed.

Of course, people will continue praying for their ailing loved ones, and by chance some of them will recover, and our folk science brains will find meaning in these random patterns; but for us to discriminate true causal inferences from false, real science trumps folk science.

Michael Shermer is publisher of *Skeptic* [*www.*skeptic.com] and an author of Science Fiction

Oil Futures, By Drake Bennett — *The Boston Globe*, February 26, 2006

According to "The Prize," Daniel Yergin's Pulitzer Prize-winning 1991 history of the oil industry, the dawning of the automotive age was a time of deep pessimism about America's oil supply. World War I had just ended and few new fields had been discovered. Crude was in such short supply that some refineries were running at half capacity. "Leading geologists," wrote Yergin, "prophesied gloomily that the limits on U.S. production were near."

Instead, the fear of shortage and the resulting rise of oil prices spurred the use of experimental prospecting techniques. The use of seismographs, aerial photography, improved drilling technology, and specialized inventions like the torsion balance and the magnetometer ushered in a new era of oil exploration, and the 1920s saw a rush of major American oil finds.

Yergin, the founder and chairman of Cambridge Energy Research Associates, a leading oil consultancy based in Cambridge, likes to tell this story to people who are worried that we have entered the final, terminal phase of exhausting the world's oil supply and that we have passed the point of what experts call ''peak oil.''

A lot of people are worrying these days. In public appearances the famed former Texas oilman T. Boone Pickens has declared that supplies are dwindling. Arjun Murti, a Goldman Sachs oil analyst who spooked markets last spring by predicting that oil could in 2007 rise to $105 a barrel, recently said that forecast might be conservative if the peak oil model is correct... And two weeks ago, Kenneth Deffeyes, a retired Princeton geology professor and leading ''peakist,'' announced on his website that, according to his calculations, global daily oil production passed into eclipse in December and began an inexorable, accelerating decline. The fact that the chairman of Kuwait's state oil company had conceded in November that the Burgan oil field, second-largest on the planet, was ''exhausted'' only seemed to underline his point. As Deffeyes wrote, ''I can now refer to the world oil peak in the past tense. My career as a prophet is over. I'm now an historian.''

But for many oil industry analysts, Yergin among them, talk about an imminent ''end of oil'' is both premature and deeply wrongheaded. The history of oil exploration, they point out, has been defined by an ever-improving ability to wring more oil out of the earth and, when necessary, to use it more efficiently. In that sense, the size of the world's oil supply is shaped primarily by the interplay of geopolitics, economics, and technological innovation. As Yergin argues in an article in the forthcoming issue of *Foreign Affairs*, it's these factors, rather than the limits of geology, that should concern us.

... Worries about the oil supply running out are as old as the oil age, and they have sometimes been well-founded. In 1956, M. King Hubbert, a former Shell research geologist then working at the U.S. Geological Survey, predicted that U.S. oil production capacity would peak in the early 1970s. Mostly ridiculed at the time, he turned out to be right: U.S. production leveled off in 1970 and has been dropping ever since. Most of today's peakists make their forecasts at least in part by applying ''Hubbert's curve'' (a bell curve in which production rises then falls as a direct function of remaining reserves) to the world supply.

The debate is over how many remaining barrels are recoverable. Colin Campbell, a Scottish former oil industry geologist who is, along with Deffeyes, one of the best-known contemporary peakists, believes it's 850 billion.

The peak, these analysts point out, is not a matter of total numbers but the rate at which we can get the oil out of the ground. The world has very little surplus oil capacity today. Fed by unexpectedly high demand from India and China, global consumption has grown briskly for the past several years, and if production levels off, a gap will open up between supply and demand. The result would be crippling shortages and oil prices far higher than any we've seen. According to Charles Maxwell, a widely respected oil industry analyst at the brokerage house Weeden & Company, a 2 percent shortfall can easily mean a 20 percent increase in price: ''Everyone around the world pays that huge penalty in order to determine who's going to go without that 2 percent.''

Maxwell himself thinks things will get pretty dire at that point. “A 20 percent spike,” he says, ''means that people can't buy clothes and housing. It slows economic growth immeasurably, and God save us from the time when instead of going flat, production starts dropping off.'' Matthew Simmons, head of a Houston-based energy investing firm and a vocal oil pessimist, has sketched a future in which oil wars proliferate as supply tails off.

Deffeyes believes we may adjust without major catastrophes, but some of the changes he portends will be hard to ignore. Even our diet will change. When fuel costs make flying vegetables up from South America prohibitively expensive, he says, ''we're going to need to rely far more on locally-grown crops, things that can be stored over the winter. We're going to have to learn to love rutabagas and parsnips and turnips, all of which I hate.''

''For a long time,'' says Henry Lee, director of the Environment and Natural Resources Program at Harvard's Kennedy School of Government and an agnostic on peak oil, ''we worried that we were running out of iron, then it was steel, then aluminum.... I'd be hard-pressed to give you a metal that we worry about in this respect today.''

Today, innovations like horizontal drilling and 3-D seismic technology are allowing oil companies to reopen previously abandoned fields. For peakists, this only means reserves are going to be exhausted sooner: ''The primary impact of technological innovation,'' Campbell says, ''has been to allow us to extract oil faster.''

Furthermore, the very definition of oil is expanding. The CERA report predicts that so-called "unconventional" oil sources condensates and natural gas liquids, oils from Canadian and Venezuelan tar sands, and ultra-deepwater oil will make up more than a third of global production by 2020. Extracting some of these remains difficult and expensive, but the costs have dropped in recent years, and most analysts predict that they will drop still further. Any future rise in the price of oil only makes these alternatives more economically feasible.

We're also getting better at stretching our supply. According to Yergin, the 1970s oil shocks set off three decades of previously unheard-of energy efficiency in the U.S., allowing the economy to grow 150 percent while energy consumption grew only 25 percent. By the time oil production plateaus, he says, "I think we'll be driving cars that get 110 miles to the gallon, 120 miles to the gallon." To assume we won't be able to adjust in time, Yergin says, "means you think the technological revolution that began in the 18th century is going to end."

The anti-peakist narrative can have a smug ring to it, with its firm faith in the power of markets and progress and rational behavior. Yergin, however, is eager to dispel any charge of complacency. He is concerned about the future of oil, he insists. It's just that what concerns him is taking place aboveground, not below. Today's tightened supply, after all, is due not to geology but geopolitics, the lack of foreign investment in Iran, the chaos in Iraq, the tumultuous politics of Venezuela, and rebel attacks in Nigeria.

[China's and India's significant exponential growth in oil consumption the last five years is a significant fact only mentioned and not examined in this article except as a cause for higher prices than we've ever seen (usually referred to as "windfall profits"). We find Yergin, founder and chairman of Cambridge Energy Research Associates (an Industry "Think Tank"), using folk science vs Deffeyes, a retired Princeton geology professor who supports his analysis by the use of science.] —*Techno-critic*

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Dr. Albert Bartlett presents an effective rebuttal of the speculative information presented as fact in the previous article. Dr. Bartlett has researched the mathematics re: "The exponential growth in consuming our finite supply of energy resources," based on Dr. M. King Hubbert's lifework.

World's oil running out — answer lies with renewable energy, professor says, by Bill Medley, staff writer, *Courier & Press* (464-7519) or [medleyb@courierpress.com], November 5, 2005

Increasing consumption rates, coupled with a growing population, will eventually result in the complete depletion of the world's oil reserves, an expert told an energy industry group Friday. Albert Bartlett, a retired physics professor from the University of Colorado, delivered that message to members of the Illinois Oil and Gas Association at the group's fall meeting at Casino Aztar.

"The growth of population and the growth of rates of consumption cannot be sustained," Bartlett said. "It isn't debatable, unless you want to debate arithmetic."

Through numerous charts, graphs, and formulas, Bartlett debunked pronouncements from various experts over the years who attempted to estimate the amount of oil or coal left in Earth. In one example, a newspaper article about a new oil field in Canada said the field's reserves would last for 50 years, when the estimated supplies from that field would actually provide the amount of oil used in just 56 days. In another example, an expert was quoted as saying the U.S. had 500 years of coal reserves remaining.

Bartlett said that would not be possible unless all the nation's reserves were recoverable and there were 500 years of no growth in coal production. A common flaw many of those estimates had, Bartlett said, was a disregard for the impact of consumption rates. For example, at a seemingly modest annual consumption rate of 7 percent, the amount of oil consumed would still double in 10 years.

Bartlett also presented data showing that in order to meet oil consumption from 2000 to 2010, oil workers would need to find reserves equal to all the oil ever produced throughout the world's history. He compared the situation to a bank account that had more withdrawals than deposits. According to Bartlett's models, U.S. oil production peaked in the early 1970s, while world production might have peaked as early as last year.

The answers lie in renewable energy, Bartlett said, but he cautioned against turning to biofuels or ethanol-blended gasoline, because those sources require the consumption of fossil fuels to produce. "You'll be lucky if there's enough energy in that gallon (of biofuel) than it takes to produce it," he said. "It's a loser."

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Virginia Deane Abernethy, [energyresources], June 17, 2006

Economists such as John Williams [www.shadowstats.com] suggest that the Household Survey report is more accurate and that calculating unemployment without recent statistical massaging techniques reveals actual unemployment in the U.S. to be 12%. In fact, Craig's report of decline in number of hours worked per week tends to support the higher unemployment figure.

Every sign and statistics highlight the utter madness of Senate Bill #2611 which would increase legal immigration and provide for guest worker status and amnesty for the [probably] 20 million illegal aliens now in the country... V.

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Outsourcing Smarts —The Death of U.S. Engineering, by Paul Craig Roberts*
[http://www.counterpunch.or/roberts06062006.html]

The May payroll jobs report released June 2 by the Bureau of Labor Statistics confirms the jobs pattern for the 21st century U.S. economy: employment growth is limited to domestic services.

In May the economy created only 67,000 private sector jobs. Job estimates for the previous two months were reduced by 37,000.

The new jobs are as follows: professional and business services, 27,000; education and health services, 41,000; waitresses and bartenders, 10,000. Manufacturing lost 14,000 jobs.

Total hours worked in the private sector declined in May. Manufacturing hours worked are 6.6 percent less than when the recovery began four-and-one-half years ago.

American economists and policymakers are in denial about the effect of jobs offshoring on U.S. employment. Corporate lobbyists have purchased fraudulent studies from economists that claim offshoring results in more U.S. employment rather than less. The same lobbyists have spread disinformation that the U.S. does not graduate enough engineers and that they must import foreigners on work visas. Lobbyists are currently pushing, as part of the immigration bill, an expansion in annual H-1B work visas from 65,000 to 115,000.

The alleged "shortage" of U.S. engineering graduates is inconsistent with reports from Duke University that 30 to 40 percent of students in its master's of engineering management program accept jobs outside the profession. About one-third of engineering graduates from MIT go into careers outside their field. Job outsourcing and work visas for foreign engineers are reducing career opportunities for American engineering graduates and also reducing salary scales.

When employers allege a shortage of engineers, they mean that there is a shortage of American graduates who will work for the low salaries that foreigners will accept. Americans are simply being forced out of the engineering professions by jobs outsourcing and the importation of foreigners on work visas. Corporate lobbyists and their hired economists are destroying the American engineering professions.

American engineering is also under pressure because corporations have moved manufacturing offshore. Design, research, and development are now following manufacturing offshore. A country that doesn't make things doesn't need engineers and designers. Corporations that have moved manufacturing offshore fund R&D in the countries where their plants have been relocated. Engineering curriculums are demanding. The rewards to the effort are being squeezed out by jobs offshoring and work visas. If the current policy continues of substituting foreign engineers for American engineers, the profession will die in the U.S.

*Paul Craig Roberts was Assistant Secretary of the Treasury in the Reagan administration; Assistant Editor of the *Wall Street Journal* editorial page; Contributing Editor of *National Review* ; coauthor of "The Tyranny of Good Intentions." He can be reached at paulcraigroberts@yahoo.com

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Mankind the Intelligent Species, No? Consider how greatly this intelligence values "Money" as more important than living within the limits of growth imposed by this finite world upon which we live!

Intelligent observations by Technocracy Cofounders Howard Scott and M. King Hubbert:

Interview by Charles H. Wood of Howard Scot, February 20, 1921, *The New York World*

"The whole problem may be stated (Scott said) as the problem of the elimination of waste, but waste to an engineer has a different meaning than it has to the general public. People generally think of waste only in terms of potato peelings…. If the elimination of that kind of waste could solve the problem, China should be the richest country on earth today; but the engineer recognizes exhaustion of any natural resource is waste."

ENERGY FROM FOSSIL FUELS, 1949, when Hubbert predicted "peak" in U.S. oil production

Human history can be divided into three distinct success phases:

The first, comprising all history prior to about 1800, was characterized by a small human population, a low level of energy consumption per capita, and very slow rates of change.

The second, based upon the exploitation of the fossil fuels and the industrial metals, has been a period of continuous and spectacular exponential growth; however, because of the finite resources of Earth's fossil fuels and metallic ores, the second phase can only be transitory.

The third phase, therefore, must again become one of the slow rates of growth, but initially at least with a large population and a high rate of energy consumption.

Perhaps the foremost problem facing mankind at present is that of how to make the transition from the present exponential growth phase to the near steady state of the future by as non-catastrophic a progression as possible. — M. King Hubbert (1903-1989)

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Political Prescience, by Kirkpatrick Sale**, June 1976** — From *Mother Jones*, September/October 2006

You would think, wouldn't you, that a group of people who go around attacking the idea of federal planning, the welfare state, racial progress, human and social equality, and democracy itself, who unblushingly applaud capitalist traditions, aristocracy, and imperialism, and who claim the United States is pretty near perfect just as it is, would be dismissed as being in the throes of dementia. Well, the fact is there is such a group of people, and not only are they not dismissed, they are, it pains me to say, being taken seriously in the councils of our government and making a considerable impact on the political and intellectual life of this nation. Don't say you weren't forewarned.

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